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2 NETWORK-BASED SYSTEM EMPLOYING AN APPLICATION SERVER THAT  
3 PROVIDES INTEGRATED MULTIPARTY INVOICE PROCESSING  
4

5 BACKGROUND OF THE INVENTION  
6

7 1. Field of the Invention

8 This invention relates broadly to electronic-based commerce systems and  
9 methods. More particularly, this invention relates to electronic-based invoicing systems  
10 and methods.  
11

12 2. State of the Art

13 In a typical commercial transaction between a seller of goods and/or services and  
14 a buyer of such goods and services, the seller creates an invoice for such goods and  
15 services that is presented to the buyer for payment by the buyer. Traditionally, the  
16 invoice is created by the seller, printed out in paper form and mailed to buyer. Upon  
17 receipt, the invoice is typically routed through an approval process at the buyer (requiring  
18 review by one or more individuals or departments within the buyer's organization). The  
19 invoice may be disputed by the buyer (requiring adjustment to the invoice, and the  
20 process begins again) or may be approved by the buyer. Once payment is authorized, the  
21 buyer issues a payment instrument (such as a check) and sends the payment instrument to  
22 the seller, seller's bank, or other entity of the seller for payment processing. This entire  
23 process may take several weeks and requires separate accounting records to be kept and  
24 harmonized at both the seller (accounts receivable) and the buyer (accounts payable).

1

2           With the advent of the Internet (and other distributed network technologies),  
3 electronic-commerce systems have been developed that streamline the traditional  
4 invoicing process by enabling electronic presentment of invoices as well as electronic  
5 payment of such invoices. An example of such a system is described in U.S. Patent  
6 Application Publication US 2003/0004874, published Jan 2, 2003. In this system, a biller  
7 system loads a batch invoice file into the system via an invoice loader. The invoices of  
8 the batch invoice file are loaded into a database. An application server enables a biller  
9 system user operating a web browser to interact with the application server over the  
10 Internet. Such biller-side interaction enables querying the invoices stored in the database,  
11 displaying the details of a selected invoice, sending messages (such as text messages and  
12 e-mail messages) to the payer associated with an invoice, adjusting and allowing an  
13 invoice, and performing other actions associated with the stored invoices. In addition, the  
14 application server enables a payer system user operating a web browser to interact with  
15 the application server over the Internet. Such payer-side interaction enables querying the  
16 invoices stored in the database, displaying the details of a selected invoice, reviewing and  
17 approving part or all of an invoice, initiating payment of an invoice, and performing other  
18 actions associated with the stored invoices. Such a system enables efficient presentment  
19 of invoices to the payer (buyer) and efficient payment of such invoices; however, the  
20 system requires a separate and distinct application executed by the biller (seller) for  
21 managing the information from which the invoices are derived and for creating invoices.  
22 This increases the total cost of the solution.

23

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2           Thus, there remains a need in the art for an improved electronic-commerce system  
3 that provides for seller-side processing that enables maintenance of billing information  
4 and creation of invoices derived from such billing information as well as buyer-side  
5 processing that enables efficient approval and payment of invoices, to thereby provide for  
6 a lower cost electronic-based invoicing solution.

7

8

## SUMMARY OF THE INVENTION

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10           It is therefore an object of the invention to provide an improved electronic-  
11 commerce system that provides seller-side processing that enables maintenance of billing  
12 information and creation of invoices derived from such billing information as well as  
13 buyer-side processing that enables efficient approval and payment of invoices.

14

15           It is another object of the invention to provide such an improved electronic-  
16 commerce system utilizing an application server framework that provides for network-  
17 based seller-side access as well as network-based buyer-side access.

18

19           It is a further object of the invention to provide such an improved electronic-  
20 commerce system wherein seller-side access and buyer-side access occur in real time  
21 over network connections to an application server framework.

22

1           In accord with these objects, which will be discussed in detail below, a system  
2   (and corresponding method) operates in conjunction with the sale of goods and/or  
3   services provided by a first entity to a second entity. The system (and corresponding  
4   method) provides for electronic presentment of bills and invoices related to such  
5   sales/transactions. It includes a first means for authenticating at least one first-entity-  
6   class user and second means for authenticating at least one second-entity-class user. An  
7   application server includes a first application component that interacts in real-time over a  
8   network with an authenticated first-entity-class user to enter, create, maintain, and store  
9   billing information and related invoices pertaining to at least one second entity. A second  
10   application component interacts in real-time over the network with an authenticated  
11   second-entity-class user to access portions of the billing information and related invoices  
12   pertaining to the authenticated second-entity-class user. The first application component  
13   and the second application component operate in conjunction with data security logic to  
14   selectively control first-entity class user access and second-entity-class user access to the  
15   billing information and related invoices maintained by the system.

16

17           It will be appreciated that electronic-based invoicing systems in accordance with  
18   the present invention enables efficient approval and payment of invoices. Moreover, the  
19   highly integrated architecture of such systems provides for a lower cost invoicing  
20   solution to both sellers and buyers and thus opens up new markets for such advanced  
21   invoicing functionality.

22

1           According to the preferred embodiment of the invention, the first application  
2   component enables access to particular billing information by at least one authenticated  
3   second-entity-class user in response to finalization of the particular billing information,  
4   wherein the finalization is accomplished by interaction with an authenticated first-entity-  
5   class user. Moreover, the first application component and second application component  
6   are preferably adapted such that the particular billing information cannot be added to an  
7   invoice until approved by an authenticated second-entity-class user. In addition, the first  
8   application component preferably enables access to particular invoice information by at  
9   least one authenticated second-entity-class user in response to posting of the particular  
10   invoice information, which is accomplished by interaction over the network with an  
11   authenticated first-entity-class user.

12

13           Additional objects and advantages of the invention will become apparent to those  
14   skilled in the art upon reference to the detailed description taken in conjunction with the  
15   provided figures.

16

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of an electronic bill presentment and invoice processing system in accordance with the present invention;

Fig. 2 is a block diagram of the functionality provided by the subscriber-administrator logic of the application server of Fig. 1 in accordance with the present invention.

Figs. 3A - 3E are pictorial illustrations of exemplary graphical user interfaces that may be displayed at the browser-based subscriber-administrator system as part of the processing provided by the subscriber-administrator logic of Fig. 2 in accordance with the present invention.

Figs. 4A - 4I are pictorial illustrations of exemplary graphical user interfaces (or reporting view(s)) that may be displayed at the browser-based subscriber-administrator system as part of the processing provided by the subscriber-administrator logic of Fig. 2 in accordance with the present invention.

1           Fig. 5 is a block diagram of the functionality provided by the subscriber-staff  
2 logic of the application server of Fig. 1 in accordance with the present invention.

3

4           Fig. 6 is a block diagram of the functionality provided by the client-administrator  
5 logic of the application server of Fig. 1 in accordance with the present invention.

6

7           Figs. 7A - 7D are pictorial illustrations of exemplary graphical user interfaces (or  
8 reporting view(s)) that may be displayed at the browser-based client-administrator system  
9 as part of the processing provided by the client-administrator logic of Fig. 6 in  
10 accordance with the present invention.

11

12           Fig. 8 is a block diagram of the functionality provided by the client-staff logic of  
13 the application server of Fig. 1 in accordance with the present invention.

14

15           Fig. 9 is a schematic diagram that illustrates various states of a billing entry  
16 through the invoicing process carried out by the invoicing system of Fig. 1 in accordance  
17 with the present invention.

18

19           Fig. 10 is a schematic diagram that illustrates various states of an invoice through  
20 the invoicing process carried out by the invoicing system of Fig. 1 in accordance with the  
21 present invention.

22

1            DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

2

3            Turning now to Fig. 1, there is shown the architecture of an electronic invoicing  
4    system 1 in accordance with the present invention. There are two classes (denoted  
5    “Subscribers” and “Clients”) of users of the system. One or more Subscribers, which  
6    belong to a Subscriber entity, access the system over a network (such as the Internet) to  
7    enter/create, update, store and view billing information (in electronic form) that is related  
8    to goods and/or services provided to one or more Clients. One or more Subscribers also  
9    access the system over the network to electronically present such billing information to  
10   the appropriate Client for review and approval by the Client. One or more Clients, which  
11   belong to a Client entity, access the system to review and approve (or disapprove) the  
12   bills electronically-presented thereto by the Subscriber(s). In this manner, the system  
13   enables centralized creation and management of the billing information and invoices by  
14   the Subscriber(s) as well as network-based collaboration that enables efficient  
15   presentation, approval, and possibly payment of invoices by the Client(s).

16

17           The Subscriber(s) of the system have a hierarchical logical organization including  
18   one or more Subscriber Administrators and zero or more Subscriber Staff Members. The  
19   Subscriber Administrator(s) has full access to the billing information maintained by the  
20   system for the particular Subscriber, and can create and maintain certain user-  
21   configurable aspects of the system for the particular Subscriber. The Subscriber Staff  
22   Member(s) are created and maintained by the Subscriber Administrator(s) and have  
23   limited access to the billing information maintained by the system for the particular



1 Subscriber. For example, in the preferred embodiment of the present invention, the  
2 Subscriber Staff Member can only view and update billing information that was  
3 originally created by the Subscriber Staff Member.

4  
5 Similarly, the client(s) of the system have a hierarchical logical organization  
6 including one or more Client Administrators and zero or more Client Staff Members.  
7 The Client Administrator(s) has limited access (for example, access granted only upon  
8 submission by the Subscriber to the Client for approval as described below) to the billing  
9 information maintained by the system for the particular Client, and can create and  
10 maintain certain user-configurable aspects of the system for the particular Client. The  
11 Client Staff Member(s) are created and maintained by the Client Administrator(s) and  
12 have limited access to the billing information maintained by the system for the particular  
13 Client. For example, in the preferred embodiment of the present invention, the Client  
14 Staff Member can only view and update billing information that was submitted by the  
15 Subscriber to the Client for approval and that is associated with a location (e.g.,  
16 Department, Division, Branch Office, etc.) of the Client submitted by the Subscriber to  
17 the Client for approval originally created by the Subscriber Staff Member.

18  
19 As shown in Fig. 1, the Subscriber Administrator(s) and Subscriber Staff  
20 (commonly referred to herein as Subscriber Administrator/Staff) utilize a web browser  
21 executing on a computing device 3 to connect to a web server 5 over the network 7 (e.g.,  
22 Internet). Similarly, the Client Administrator(s) and Client Staff (commonly referred to  
23 herein as Subscriber Administrator/Staff) utilize a web browser executing on a computing

1 device 9 to connect to the web server 5 over the network 7. Preferably, the browser-  
2 based interaction between the computing devices 3, 5 and the web server 5 occur over  
3 TCP/IP sessions established therebetween over which are communicated HTML-based  
4 (and possibly XML-based) documents and commands as well as other messages,  
5 commands and data. The web server 5 enables login and authentication of Subscriber  
6 Administrator/Staff via interaction with the Subscriber system 3 as well as login and  
7 authentication of Client Administrator/Staff via interaction with the Client system 9.  
8 Such login and authentication can utilize password-based authentication, operating  
9 system-based authentication (e.g., NTLM or Kerberos); services-based authentication  
10 (e.g., Microsoft Passport authentication), certificate-based authentication, or any other  
11 authentication scheme. Once a user session has been authorized (whether it be a  
12 Subscriber Administrator/Staff session or Client Administrator/Staff session), the web  
13 server 5 communicates with an Application Server 11 to build dynamic web page(s)  
14 based on data supplied by the Application Server 11 and serve the dynamic web page(s)  
15 to the Subscriber Administrator/Staff web browser (or the Client Administrator/Staff web  
16 browser) as requested, and forward (and/or transform) data supplied by the Subscriber  
17 Administrator/Staff web browser (or Subscriber Administrator/Staff web browse) to the  
18 Application Server 11 as needed. Preferably, the web server 5 is located in a  
19 “demilitarized zone” (DMZ) provided with a firewall router 13. In, this configuration,  
20 the firewall/router 13 enables authorized communication between the web server 5 and  
21 the Application Server 11 (typically utilizing a secure socket layer (SSL) interface or an  
22 IPsec interface), while blocking unauthorized communication requests to the Application  
23 Server 11. In addition, the web server 5 preferably utilizes style sheets to build the

1 HTML documents (and XML documents) for presentment to the Subscriber  
2 Administrator/Staff web browser (or Subscriber Administrator/Staff web browse). The  
3 web server 5 may be realized by commercially available HTTP servers, such as the  
4 Apache Web Server, Microsoft Internet Information Server, and Sun ONE Web Server.

5  
6 The Application Server 11 includes a Subscriber Application Component 15, a  
7 Client Application Component 17, Administration/Configuration Logic 19, Data Security  
8 Logic 21, a Database 23 storing bills and invoices, Presentation Services 25, Network  
9 Security Services 27, and possibly Messaging Logic 29. The  
10 Administration/Configuration Logic 19 provides for system management and  
11 configuration of the Application Server 11. The Presentation Services 25 are facilities  
12 that enable delivering dynamic content to client browsers. Preferably, the Presentation  
13 Services 25 support Active Server Pages, JavaServer pages, server-side scripting such as  
14 Perl, CGI, PL/SQL scripting, etc. The Network Security Services 27 provides facilities  
15 that enable maintaining network security (such as SSL-based or IPSec-based encryption  
16 and authentication facilities). Preferably, the Application Server 11 is realized by a  
17 commercially-available software framework, such as the WebLogic Platform  
18 commercially available from BEA Systems of San Jose, CA, the Websphere Application  
19 Server commercially available from IBM, Windows Server Systems commercially  
20 available from Microsoft Corporation of Redmond, WA, or the SUN ONE Application  
21 Server commercially available from Sun Microsystems of Santa Clara, CA.

22

1           The Subscriber Application component 15, works in conjunction with the  
2   Presentation Services 25 and other components of the Application Server 11, to provide  
3   dynamic content to the web server 5 for delivery to the browser-based Subscriber  
4   Administrator/Staff system 3. The Subscriber Application component 15 also encodes  
5   business logic that represents the Subscriber-side part of the invoicing process (e.g., the  
6   creation, update, storage, and finalization of invoices on the part of the Subscriber  
7   Administrator/Staff). It also updates state information that represents the status of  
8   invoices in conjunction with this invoicing process.

9  
10          The Client Application component 17, works in conjunction with the Presentation  
11   Services 25 and other components of the Application Server 11, to provide dynamic  
12   content to the web server 5 for delivery to the browser-based Client Administrator/Staff  
13   system 9. The Client Application component 17 also encodes business logic that  
14   represents the Client-side part of the invoicing process (e.g., the review,  
15   approval/rejection, and payment of invoices on the part of the Client  
16   Administrator/Staff). It also updates state information that represents the status of  
17   invoices in conjunction with this invoicing process.

18  
19          The billing information and invoices created and updated during the invoicing  
20   process is stored in the database 23. The database 23 can be realized by files stored by  
21   the application server 17. Alternatively, the database 23 can be realized by a relational  
22   database that is part of the application server (as shown), or coupled thereto by an  
23   appropriate database connector interface.

1

2           Data Security Logic 21 provides facilities that enable controlled-access to the  
3 information stored in the database 23. In the invoicing system of the present invention,  
4 the Data Security Logic 21 provides user-level access control to the billing information  
5 and invoices that are created and maintained by the Subscriber-side part of the invoicing  
6 process. For example, it is preferred that such information remain inaccessible to the  
7 Client Administrator/Staff until an invoice is finalized for submission to the Client entity.  
8 In addition, it is preferred that the Application Server 11 include Messaging Logic 29 that  
9 provides facilities that support messaging between Subscriber Administrator/Staff and  
10 Client Administrator/Staff. The messaging can be in the form of text messages, instant  
11 messages, or e-mail messages.

12

13           The processing functionality provided by the Subscriber Application Component  
14 15 is preferably logically partitioned into two parts: Subscriber-Administrator logic 31  
15 and Subscriber-Staff logic 33. The Subscriber-Administrator logic 31 interacts with a  
16 browser-based Subscriber-Administrator user to perform various functions as part of the  
17 Subscriber-side invoice processing. Examples of such functions are described below  
18 with respect to Figs. 2 through 4I. The Subscriber-Staff logic 33 interacts with a  
19 browser-based Subscriber-Staff user to perform various functions as part of the  
20 Subscriber-side invoice processing. Examples of such functions are described below  
21 with respect to Fig. 5.

22

1 Similarly, the processing functionality provided by the Client Application  
2 Component 17 is preferably logically partitioned into two parts: Client-Administrator  
3 logic 35 and Client-Staff logic 37. The Client-Administrator logic 35 interacts with a  
4 browser-based Client-Administrator user to perform various functions as part of the  
5 Client-side invoice processing. Examples of such functions are described below with  
6 respect to Figs. 6 through 7D. The Client-Staff logic 37 interacts with a browser-based  
7 Client-Staff user to perform various functions as part of the Client-side invoice  
8 processing. Examples of such functions are described below with respect to Fig. 8.

9  
10 Turning now to Fig. 2, there is shown a high-level schematic representation of  
11 exemplary functions provided by the Subscriber-Administrator logic 31. Such functions  
12 include a block 201 that interacts with a browser-based Subscriber-Administrator user to  
13 create a Client entity. An example of the graphical user interface that may be displayed  
14 at the browser-based Subscriber-Administrator system 3 as part of block 201 is shown in  
15 Fig. 3A. It enables the Subscriber-Administrator user to create a Client by entering the  
16 Client name (labeled "Customer Name"), Client Administrator login name and password,  
17 and Contact Name and address and contact information, and Location name and address  
18 and contact information. Once the Client is set up, the Subscriber-Administrator user  
19 turns over the Client-Administrator login name and password to the Client. The Client-  
20 Administrator now becomes the Administrator for the Client account. If the Client is  
21 currently using the system, the block 201 enables the Subscriber-Administrator to search  
22 for the Client and assign the Client to his account.  
23

1           The Subscriber-Administrator logic 31 also preferably includes a block 203 that  
2 enables the Subscriber-Administrator user to create (or change) a contract (or project)  
3 that pertains to a specific Client. An example of the graphical user interface that may be  
4 displayed at the browser-based Subscriber-Administrator system 3 as part of block 203 is  
5 shown in Fig. 3B. It enables the Subscriber-Administrator user to create a  
6 contract/project by defining a contract name and time period (e.g., start date and end  
7 date). The contract/project may have recurring periods (of one or more types) and may  
8 be associated with only one location of the specific Client. The project/contract can also  
9 specify rules and conditions that dictate how billing is carried out for the contract period.  
10 For example, it can specify that all billing associated with this project/contract is pre-  
11 approved. In this case, the billing information does not require approval by the specific  
12 Client before it is accumulated into an invoice for submission to the specific Client. In  
13 another example, it can specify a number of units (such as man-hours) that are billed free-  
14 of-charge during the contract period, or a number of cutoff units (such as man-hours) and  
15 associated billing rate adjustment. In this case, in the event that the number of units  
16 billed in the contract period exceeds the number of cutoff units, the difference and billing  
17 rate adjustment is used to determine the bill. In another example, the contract/project can  
18 be setup to automatically generate invoices for specific Clients, or a Client and Location  
19 combination. Preferably, only Subscriber-Administrator users are allowed create and  
20 maintain contracts and projects.

21

22           The Subscriber-Administrator logic 31 also preferably includes a block 205 that  
23 enables the Subscriber-Administrator user to create (or change) billing rates associated

1 with particular services (labeled “task) provided by the Subscriber entity to one or more  
2 Client entities. An example of the graphical user interface that may be displayed at the  
3 browser-based Subscriber-Administrator system 3 as part of block 205 is shown in Fig.  
4 3C. It enables the Subscriber-Administrator user to define a billing rate for a given task.  
5 The billing rate can be selectively applied to all Subscriber-staff members (or a particular  
6 Subscriber-Staff member), to all clients (or a particular client), and/or to a particular  
7 client location. The selections allow the same Subscriber-Staff member to be billed out  
8 at varying rates for the same task for different Clients.

9  
10 The Subscriber-Administrator logic 31 also preferably includes a block 207 that  
11 enables the Subscriber-Administrator user to define a Subscriber-Staff member. An  
12 example of the graphical user interface that may be displayed at the browser-based  
13 Subscriber-Administrator system 3 as part of block 207 is shown in Fig. 3D. It enables  
14 the Subscriber-Administrator user to create a Subscriber-Staff member by entering the  
15 Subscriber-Staff name, Login name and password, other miscellaneous information (e.g.,  
16 social security number, gender, salary, etc), and selecting one or more Clients that are  
17 affiliated with the Subscriber-Staff member.

18  
19 The Subscriber-Administrator logic 31 also preferably includes a block 209 that  
20 enables the Subscriber-Administrator user to assign (and create) billing services (referred  
21 to as “tasks”) associated with particular Client. An example of the graphical user  
22 interface that may be displayed at the browser-based Subscriber-Administrator system 3  
23 as part of block 209 is shown in Fig. 3E. It enables the Subscriber-Administrator user to



1 selectively assign one or more tasks to a particular Client (or all Clients), or to possibly a  
2 particular Client location. The task is a short description of the services provided by the  
3 Subscriber entity. Preferably, the billing tasks associated with a particular Client are used  
4 only in conjunction with Time Billing of the particular Client.

5  
6 The Subscriber-Administrator logic 31 also preferably includes blocks 211 and  
7 213 that enable the Subscriber-Administrator to create (and maintain) Accounts Payable  
8 information and Accounts Receivable Information as well as a General Ledger,  
9 respectively. Such functionality is well known in the electronic-based accounting arts.  
10 The integrated Accounts Payable functionality of block 213 enables the Subscriber-  
11 Administrator to easily calculate payment for the Subscriber-Staff member(s). Within  
12 this functionality, disbursements to the Subscriber-Staff can be easily generated and  
13 managed throughout the system. For example, profit and loss reports can be generated to  
14 analyze the billed vs. compensation for any Subscriber-Staff member(s). Such profit and  
15 loss reports is derived from the same data that is entered for billing by the Subscriber-  
16 Staff member(s) (see block 501 of Fig. 5 and accompanying description). The  
17 Subscriber-Staff also has access to disbursements made to them (see block 503 of Fig. 5  
18 and accompanying description), and checks are generated using existing staff  
19 information, reducing duplicate data entry. Note that Accounts Payable information and  
20 Accounts Receivable information is not available to Client users (e.g., Client-  
21 Administrators and/or Client-Staff).

22

1           The Subscriber-Administrator logic 31 also preferably includes a block 215 that  
2 enables the Subscriber-Administrator user to enter (or update) time-based billing  
3 information for a particular Client. An example of the graphical user interface that may  
4 be displayed at the browser-based Subscriber-Administrator system 3 as part of block 215  
5 is shown in Fig. 4A. It enables the Subscriber-Administrator user to enter time-based  
6 billing information for a specific Client and Location. It also enables the Subscriber-  
7 Administrator user to select a contract/project of the particular Client and (and possibly a  
8 task assigned to the particular Client and contract/project). The description of the  
9 services provided (labeled "billing description") can be selected from a pull-down menu  
10 as shown and then edited. The user selects from a pop-up calendar (or manually enters)  
11 the date that the services are provided. Total units are automatically calculated based on  
12 the Start and End time entered by the user, unless the user enters a number in the Total.  
13 In this case, the Start and End Times are ignored. Free Units are subtracted from the  
14 Total Units. The billing information entered (or updated) in block 215 is stored in the  
15 database 23 for subsequent access therefrom.

16  
17           The Subscriber-Administrator logic 31 also preferably includes blocks 217 and  
18 219 that enable the Subscriber-Administrator user to enter one-time billing information or  
19 other miscellaneous billing information (such as expenses or other non-time related  
20 billing information) for a particular Client, respectively. An example of the graphical  
21 user interface that may be displayed at the browser-based Subscriber-Administrator  
22 system 3 as part of block 217 is shown in Fig. 4B. It enables the Subscriber-  
23 Administrator user to enter billing information for a specific Client and Location. It also

1 enables the Subscriber-Administrator user to select a contract/project of the particular  
2 client. The user enters the date that the goods or services are provided, a description of  
3 such goods or services to be billed, and cost information (e.g., number of units, unit cost,  
4 tax rate) for such goods or services. A similar graphical user interface may be displayed  
5 at the browser-based Subscriber-Administrator system 3 as part of block 219. The billing  
6 information entered (or updated) in blocks 217 and 219 is stored in the database 23 for  
7 subsequent access therefrom.

8

9       The Subscriber-Administrator logic 31 also preferably includes a block 221 that  
10 enables the Subscriber-Administrator user to process and administer billing information  
11 stored in the database 23. An example of a graphical user interface that may be displayed  
12 at the browser-based Subscriber-Administrator system 3 as part of block 221 is shown in  
13 Fig. 4C. It enables a Subscriber-Administrator user to edit/update a billing entry stored in  
14 the database 23, and approve the billing entry for submission to the Client. By selecting  
15 the Submit action text, the block 221 cooperates with the Data Security Logic 21 to  
16 enable one or more Client-Administrator users (and possibly one or more Client-Staff  
17 users) to access the billing entry stored in the database 23 for subsequent access  
18 therefrom. A more detailed description of the role-based access controls for a billing  
19 entry during the invoicing process is set forth below with respect to Fig. 9.

20

21       The Subscriber-Administrator logic 31 also preferably includes a block 223 that  
22 enables the Subscriber-Administrator user to create (and process) invoices that are  
23 derived from the billing information stored in the database 23. An example of the

1 graphical user interfaces that may be displayed at the browser-based Subscriber-  
2 Administrator system 3 as part of block 223 are shown in Figs. 4D, 4E and 4F. The  
3 graphical user interface of Fig. 4D enables the Subscriber-Administrator user to create an  
4 invoice for a specific Client and Location and user-selected date range. The user enters  
5 the date for the invoice and possibly other information (e.g., invoice type, due date,  
6 account that will be paid, purchase order code, etc). When the user selects the create  
7 button, the functionality of block 221 queries the database 23 to identify the billing  
8 information stored therein that pertains to the specific Client and Location and falls  
9 within the user-selected date range (and which has been approved by the Client and has  
10 not yet been incorporated into an invoice), adds such billing information to an invoice,  
11 and displays information for the invoice (such as the invoice date, Client, dollar amount  
12 for the invoice, billing descriptions and dates for the billing information from which the  
13 invoice is derived, etc). The graphical user interface of Fig. 4E enables the Subscriber-  
14 Administrator user to finalize (sometimes referred to herein as “post” or “posting”) an  
15 invoice for submission to the Client. By selecting the Post action text, the block 223  
16 cooperates with the Data Security Logic 21 to enable one or more Client-Administrator  
17 users (and possibly one or more Client-Staff users) to access the invoice entry stored in  
18 the database 23 for subsequent access therefrom. The graphical user interface of Fig. 4F  
19 enables the Subscriber-Administrator user to cancel the post of an invoice for submission  
20 to the Client. By selecting the Cancel action text, the block 223 cooperates with the Data  
21 Security Logic 21 to disable Client-Administrator users (and Client-Staff users) access to  
22 the invoice entry stored in the database 23. In this manner, the invoice entry reverts back  
23 to being hidden from the Client-Administrator users (and Client-Staff users) of the

1 system. A more detailed description of the role-based access controls of an invoice  
2 during the invoicing process is set forth below with respect to Fig. 10. Preferably, an  
3 invoice is identified with a date when it is OPEN (i.e., it has not been finalized/posted).  
4 After finalization, a number is assigned to the invoice and that is the number that is  
5 referenced throughout the life of the invoice.

6  
7 The Subscriber-Administrator logic 31 also preferably includes a block 225 that  
8 enables the Subscriber-Administrator user to generate (and print) reports related to billing  
9 entries and invoices stored in the database 23. An example of the graphical user  
10 interfaces that may be displayed at the browser-based Subscriber-Administrator system 3  
11 as part of block 225 are shown in Figs. 4G, 4H and 4I. The graphical user interface of  
12 Fig. 4G enables the Subscriber-Administrator user to specify a Client (or Client-  
13 Location) and possibly specify a date range and/or other criteria. Upon selection of the  
14 view report button, the billing entry(ies) and/or invoices stored in the database 23 that  
15 match the user-specified criteria are displayed as a report. An example of a report of  
16 billing information is shown in Fig. 4H. An example of a report for invoices is shown in  
17 Fig. 4I, which enables the Subscriber-Administrator user to edit, update and process an  
18 invoice by selecting the Invoice number action text. It also enables the Subscriber-  
19 Administrator user to apply and reconcile payment of the invoices by entering the  
20 appropriate information.

21

22 Turning now to Fig. 5, there is shown a high-level schematic representation of  
23 exemplary functions provided by the Subscriber-Staff logic 33. Such functions include a

1 block 501 that interacts with a browser-based Subscriber-Staff user to enter (or update)  
2 billing information for a particular Client. Such billing information can be time-based  
3 billing information, one time billing information, or other miscellaneous billing  
4 information. The billing information entered (or updated) in block 501 is stored in the  
5 database 23 for subsequent access. Graphical user interfaces similar to those described  
6 above with respect to Figs. 4A, 4B and 4C may be displayed at the browser-based  
7 Subscriber-Staff system 3 as part of block 501. Preferably, billing entries created by the  
8 Subscriber-Staff user can be readily updated by the Subscriber-Staff user until it is  
9 submitted by the Subscriber-Staff user. Upon submission, a billing entry can be accessed  
10 and viewed by the Subscriber-Staff user, but can be edited only by a Subscriber-  
11 Administrator user. The Subscriber-Administrator user then approves the billing entry for  
12 submission to the Client as described above with respect to Fig. 4C.

13

14 The Subscriber-staff logic 33 also preferably includes block 503 that enables the  
15 Subscriber-Staff user to generate (and print) reports related to billing entries created (or  
16 updated) by the specific Subscriber-Staff user and stored in the database 23. Graphical  
17 user interfaces similar to those described above with respect to Figs. 4G and 4H may be  
18 displayed at the browser-based Subscriber-Staff system 3 as part of block 503. In this  
19 case, the displayed billing entries pertain to the Subscriber-staff user. Moreover, the  
20 functionality of block 503 preferably enables the Subscriber-Staff user to access  
21 disbursements made to the user as part of the Accounts Payable functionality of block  
22 211 (described above with respect to Fig. 2).

23

1           In the event that a given Subscriber-staff user performs services for multiple  
2 Client entities of the system, it is preferred that the authentication facilities (e.g., login  
3 name and password) for the Subscriber-staff user provide access to the billing data for the  
4 multiple Clients. This minimizes the complexity of the authentication process of the  
5 Subscriber-staff user (for example, the user need not remember and/or enter separate  
6 passwords for each Client).

7  
8           The Subscriber-Staff logic 33 may also provide a number of unique features that  
9 are afforded to the Subscriber-Staff members, including generating a report of earnings  
10 for a time period (which is preferably specified by user input) and any checks that were  
11 generated through the system.

12  
13           Turning now to Fig. 6, there is shown a high-level schematic representation of  
14 exemplary functions provided by the Client-Administrator logic 35. Such functions  
15 include a block 601 that interacts with a browser-based Client-Administrator user to  
16 create (or update) a Client-Staff member for the Client entity to whom the Client-  
17 Administrator belongs. A graphical user interface similar to that described above with  
18 respect to Fig. 3D may be displayed at the browser-based Client-Administrator system 9  
19 as part of block 601 is shown in Fig. 3D. It enables the Client-Administrator user to  
20 create (or update) a Client-Staff member by entering the Client-Staff name, Login name  
21 and password, other miscellaneous information (e.g., social security number, gender,  
22 salary, etc), and selecting one or more Subscribers that are affiliated with the Client-Staff  
23 member.

1

2       The Client-Administrator logic 35 also preferably includes a block 603 that  
3 enables the Client-Administrator user to create (or update) one or more locations (e.g.,  
4 Department, Division, Branch Office, etc.) of the Client entity to which the Client-  
5 Administrator logic belongs. Preferably, in block 603, the Client-Administrator user  
6 enters (or updates) the name, address, and other miscellaneous information (such as  
7 location contact information) for the location. In addition, in block 603, the Client-  
8 Administrator user preferably can assign one or more Client-Staff members to one or  
9 more locations.

10

11       The Client-Administrator logic 35 also preferably includes a block 605 that  
12 enables the Client-Administrator user to create (or change) a contract (or project) for the  
13 Client entity to whom the Client-Administrator belongs. A graphical user interface  
14 similar to that described above with respect to Fig. 3B may be displayed at the browser-  
15 based Client-Administrator system 9 as part of block 605. It enables the Client-  
16 Administrator user to create a contract/project by defining a contract name and time  
17 period (e.g., start date and end date). The contract/project may have recurring periods (of  
18 one or more types) and may be associated with one or more locations of the Client. The  
19 project/contract can also specify rules and conditions that dictate how billing is carried  
20 out for the contract period. For example, it can specify that all billing associated with this  
21 project/contract is pre-approved. In this case, the billing information does not require  
22 approval by the Client before it is accumulated into an invoice for submission to the  
23 Client. In another example, the contract/project can be set up to automatically generate



1 invoices for specific Clients, or a Client and Location combination. Preferably, only  
2 Client-Administrator users are allowed create and maintain contracts and projects.

3  
4 The Client-Administrator logic 35 also preferably includes a block 607 that  
5 enables the Client-Administrator user to process and administer billing information stored  
6 in the database 23 that pertain to the specific Client to whom the Client-Administrator  
7 belongs. An example of a graphical user interface that may be displayed at the browser-  
8 based Client-Administrator system 9 as part of block 607 is shown in Fig. 7A. It enables  
9 a Client-Administrator user to review and approve billing entries stored in the database  
10 23 that pertain to a specific Subscriber entity. The specific Subscriber entity is associated  
11 with the Client entity to whom the Client-Administrator belongs. Approval is  
12 accomplished by selecting the Approval All action text for a given billing entry.  
13 Preferably, such approval enables the billing entry to be added to an invoice by the  
14 specific Subscriber as described below with respect to Fig. 9. In the processing of block  
15 607, billing entries that are "OPEN" and have yet to be "FINALIZED" by the specific  
16 Subscriber are not accessible to any Client-Administrator user (or any Client-Staff user).  
17 Thus, only the billing entries that have been "FINALIZED" by the specific Subscriber are  
18 accessible to the Client-Administrator user for review and approval.

19  
20 The Client-Administrator logic 35 also preferably includes a block 609 that  
21 enables the Client-Administrator user to process and administer invoices that are derived  
22 from the billing information stored in the database 23. An example of a graphical user  
23 interface that may be displayed at the browser-based Client-Administrator system 9 as

1 part of block 609 is shown in Fig. 7B. It enables the Client-Administrator user to review  
2 the invoices for one or more specific Subscribers (and possibly for other user selected  
3 criteria such as a particular Subscriber, Client-Location, user-selected date range etc).  
4 The specific Subscriber(s) are associated with the Client entity to whom the Client-  
5 Administrator belongs. When the user selects the invoice identifier action text, the  
6 details of the invoice are displayed for review by the Client-Administrator user.  
7 Preferably, block 609 also enables the Client-Administrator user to initiate payment (e.g.,  
8 full payment or partial payment) for a particular invoice (or provide an indication of such  
9 payment), which changes the state of the invoice. This state change is accessible to the  
10 Subscriber that submitted the invoice as described below with respect to Fig. 10. In the  
11 processing of block 609, invoices that are "OPEN" and have yet to be "COMMITTED"  
12 by the specific Subscriber(s) of the Client are not accessible to any Client-Administrator  
13 user (or any Client-Staff user). Thus, only the invoices that have been "COMMITTED"  
14 by the specific Subscriber(s) are accessible to the Client-Administrator user for review  
15 and administration. In block 609, payment of one or more invoices may be accomplished  
16 by a payment transaction electronically submitted to the bank of the Subscriber or an  
17 Automated Clearing House, by an automated credit card (or debit card) transaction, or by  
18 other electronic payment settlements means. Alternatively, the payment of one or more  
19 invoices may be accomplished by traditional payment mechanisms, such as mailing a  
20 paper check to the specific Subscribers.

21

22 The Client-Administrator logic 35 also preferably includes a block 611 that  
23 enables the Client-Administrator user to generate (and print) reports related to billing

1 entries and invoices stored in the database 23. A graphical user interface similar to that  
2 shown in Fig. 4G may be displayed at the browser-based Client-Administrator system 9  
3 as part of block 611, which enables the Client-Administrator user to specify a Subscriber  
4 (and possibly Client-Location) and possibly specify a date range and/or other criteria.  
5 Upon selection of the view report button, the billing entry(ies) and/or invoices stored in  
6 the database 23 that match the user-specified criteria are displayed as a report. An  
7 example of a report of billing information is shown in Fig. 7C. An example of a report  
8 for invoices is shown in Fig. 7D.

9  
10 Turning now to Fig. 8, there is shown a high-level schematic representation of  
11 exemplary functions provided by the Client-Staff logic 37. Such functions include a  
12 block 801 that interacts with a browser-based Client-Staff user at Client system 9 to  
13 generate (and print) reports related to billing entries created (or updated) by the specific  
14 Client-Staff user and stored in the database 23. Graphical user interfaces similar to those  
15 described above with respect to Figs. 4G and 4H may be displayed at the browser-based  
16 Client-Staff system 9 as part of block 801. In this case, the displayed billing entries  
17 pertain to the Client-Staff user.

18  
19 Turning now to Fig. 9, there is shown a schematic diagram that illustrates various  
20 states of a billing entry through the invoicing process carried out by the invoicing system  
21 of Fig. 1 in accordance with the present invention. In each state, a set of security  
22 classifications (denoted "Y" for access granted, and "N" for access not granted) dictate  
23 access to the billing entry by Subscriber-Administrator users (denoted "S-A"),

1 Subscriber-Staff users (denoted “S-S”), Client-Administrator users (denoted “C-A”), and  
2 Client-Staff users (denoted “C-S”) in the state.

3

4 When a billing entry is created (or updated), it has an “OPEN” state. In the  
5 “OPEN” state, Subscriber-Administrator users and those Subscriber-Staff users that  
6 created (or added to) the billing entry can access the billing entry. However, the Client-  
7 Administrator users and Client-Staff users cannot access the billing entry.

8

9 When a Subscriber-Administrator user approves the billing entry, the state of the  
10 billing entry transitions to the “FINALIZED” state. In the “FINALIZED” state,  
11 Subscriber-Administrator users and those Subscriber-Staff users that created (or added to)  
12 the billing entry can access the billing entry. In addition, the Client-Administrator users  
13 and those Client-Staff users designated by a Client-Administrator can also access the bill.  
14 The application server 11 may cooperate with messaging logic 29 to notify a designated  
15 Client-Administrator of the submission of the billing entry by the Subscriber entity to the  
16 Client for approval by the client.

17

18 When a Client-Administrator user (or possibly a designated Client-Staff user)  
19 approves a “FINALIZED” billing entry, the state of the billing entry transitions to the  
20 “APPROVED BY CLIENT” state. In the “APPROVED BY CLIENT” state, Subscriber-  
21 Administrator users and those Subscriber-Staff users that created (or added to) the billing  
22 entry can access the billing entry. In addition, the Client-Administrator users and those  
23 Client-Staff users designated by a Client-Administrator can also access the billing entry.

1 The application server 11 may cooperate with messaging logic 29 to notify a designated  
2 Subscriber-Administrator of the approval of the billing entry by the Client. Note that in  
3 some cases (for example, where the billing entry is associated with a contract/project for  
4 which automatic invoicing has been selected), the state of the billing entry automatically  
5 transitions from the "FINALIZED" state to the "APPROVED BY CLIENT" state  
6 without Client approval. Preferably, in the "APPROVED BY CLIENT" state, the billing  
7 information in the billing entry can be added to an invoice; while, in the other states, the  
8 billing information in the billing entry cannot be added to an invoice.

9  
10 When a Client-Administrator user (or possibly a designated Client-Staff user)  
11 rejects a "FINALIZED" billing entry, the state of the billing entry transitions to the  
12 "REJECTED BY CLIENT" state. In the "REJECTED BY CLIENT" state, Subscriber-  
13 Administrator users and those Subscriber-Staff users that created (or added to) the billing  
14 entry can access the billing entry. In addition, the Client-Administrator users and those  
15 Client-Staff users designated by a Client-Administrator can also access the bill. The  
16 application server 11 may cooperate with messaging logic 29 to notify a designated  
17 Subscriber-Administrator of the rejection of the billing entry by the Client. The  
18 Subscriber entity is then free to re-open the billing entry for adjustment, clarification, or  
19 resubmission. In this case, the state of the billing entry reverts back to the "OPEN" state  
20 and the process begins again.

21

22 Turning now to Fig. 10, there is shown a schematic diagram that illustrates  
23 various states of an invoice through the invoicing process carried out by the invoicing

1 system of Fig. 1 in accordance with the present invention. In each state, a set of security  
2 classifications (denoted "Y" for access granted, and "N" for access not granted) dictate  
3 access to the billing entry by Subscriber-Administrator users (denoted "S-A"),  
4 Subscriber-Staff users (denoted "S-S"), Client-Administrator users (denoted "C-A"), and  
5 Client-Staff users (denoted "C-S") in the state.

6  
7 When an invoice is created (or updated), it has an "OPEN" state. In the "OPEN"  
8 state, Subscriber-Administrator users can access the invoice. However, the Subscriber-  
9 Staff users, Client-Administrator users and Client-Staff users cannot access the invoice.

10  
11 When a Subscriber-Administrator user posts the invoice, the state of the billing  
12 entry transitions to the "COMMITTED" state. In the "COMMITTED" state, Subscriber-  
13 Administrator users can access the invoice, while the Subscriber-Staff users cannot  
14 access the invoice. In addition, the Client-Administrator users and those Client-Staff  
15 users designated by a Client-Administrator can also access the invoice. The application  
16 server 11 may cooperate with messaging logic 29 to notify a designated Client-  
17 Administrator of the posting of the invoice by the Subscriber entity to the Client for  
18 payment by the Client.

19  
20 When a Client-Administrator user (or possibly a designated Client-Staff user)  
21 initiates full-payment (or provides an indication of such full-payment) for a  
22 "COMMITTED" invoice, the state of the invoice transitions to the "PAID-IN-FULL"  
23 state. In the "PAID-IN-FULL" state, Subscriber-Administrator users can access the

1 invoice, while the Subscriber-Staff users cannot access the invoice. In addition, the  
2 Client-Administrator users and those Client-Staff users designated by a Client-  
3 Administrator can also access the invoice. The application server 11 may cooperate with  
4 messaging logic 29 to notify a designated Subscriber-Administrator of the full-payment  
5 of the invoice (or indication thereof) by the Client.

6  
7 When a Client-Administrator user (or possibly a designated Client-Staff user)  
8 initiates partial-payment (or provides an indication of such partial-payment) for a  
9 “COMMITTED” invoice, the state of the invoice transitions to the “PAID-IN-PART”  
10 state. In the “PAID-IN-PART” state, Subscriber-Administrator users can access the  
11 invoice, while the Subscriber-Staff users cannot access the invoice. In addition, the  
12 Client-Administrator users and those Client-Staff users designated by a Client-  
13 Administrator can also access the invoice. The application server 11 may cooperate with  
14 messaging logic 29 to notify a designated Subscriber-Administrator of the partial-  
15 payment of the invoice (or indication thereof) by the Client. The Subscriber entity is then  
16 free to re-open the invoice for adjustment, clarification, or resubmission. In this case, the  
17 state of the invoice reverts back to the “OPEN” state and the process begins again.

18  
19 Advantageously, the electronic-based invoicing systems of the present invention  
20 provides for seller-side processing that enables real-time entry and maintenance of billing  
21 information and creation of invoices derived from such billing information as well as  
22 buyer-side processing that enables efficient approval and payment of invoices. This

1 highly integrated architecture provide for a lower cost invoicing solution to both sellers  
2 and buyers and thus opens up new markets for such advanced invoicing functionality.

3

4       There have been described and illustrated herein several embodiments of systems  
5 and methods for carrying out electronic bill presentment and invoicing. While particular  
6 embodiments of the invention have been described, it is not intended that the invention be  
7 limited thereto, as it is intended that the invention be as broad in scope as the art will  
8 allow and that the specification be read likewise. Thus, while particular invoicing  
9 processes has been disclosed, it will be appreciated that other invoicing processes can be  
10 realized as well. For example, and not by way of limitation, the roles of the subscriber  
11 users and client users of the system can be readily adapted to accommodate variations in  
12 the invoicing process carried out by the system. Such role changes result in adaptations  
13 to the logical components of the application server that carry out the invoicing process.  
14 Also, while preferred system architectures, graphical user interfaces, and underlying  
15 functional logic has been disclosed, it will be understood that modifications thereto can  
16 be similarly used. It will therefore be appreciated by those skilled in the art that yet other  
17 modifications could be made to the provided invention without deviating from its spirit  
18 and scope as claimed.